Verification of Reagents and Solvents

1 Purpose

This document sets forth the procedures regarding verification and records of reagents and solvents and supplements the requirements in the FBI Laboratory *Quality Assurance Manual (QAM)* and the FBI *Laboratory Operations Manual (LOM)*. These procedures are to be used in conjunction with the Performance Monitoring Protocols (PMPs) for individual instruments and the Standard Operating Procedures (SOPs) for analysis of evidence.

2 Scope

These procedures apply to caseworking personnel conducting work in explosives chemistry analysis who use reagents and solvents in casework.

3 Equipment/Materials/Reagents

The equipment, materials, and reagents used to verify a reagent or solvent will depend upon the nature of the substance (e.g., mobile phase, pH paper). Since most of these verifications will be performed following an established explosives chemistry SOP, the equipment, materials, and reagents required for such verifications will be listed within the SOP used as well as in the Instrument Parameters and Reagent Preparation SOP.

4 Standards and Controls

Test strips and colorimetric tests (e.g., pH paper, peroxide test strips, water finding paper, colorimetric test kits) will be tested with appropriate positive and/or negative controls, as appropriate, prior to use on evidence.

5 Procedures

5.1 Purchasing Reagents and Solvents

Reagents and solvents will be purchased following the procedures for purchasing services and supplies as outlined in the Explosives Quality Assurance Manual Administrative Structure and Operating Guidelines.

5.2 Verification of Reliability

The reliability of reagents and solvents must be verified prior to, or in concurrence with casework. This may be completed in any of the following ways:

- Follow the reagent verification instructions given in the SOP for the particular analysis in which the reagent is used, when available.
- Perform the analysis using suitable standards, controls, and/or blanks and evaluate the outcome.
- Conduct a measurement of a specific chemical property (e.g., pH, presence of peroxide).
- Evaluate solvents used for extractions or dilutions to ensure they are free of contaminants and interferents.

The reagent reliability verification data will be kept within the instrumentation or mobile phase log or examination records.

For mobile phases, at the time of preparation or upon first use, a testmix and a blank are analyzed using the new mobile phase. The new mobile phase should give the expected results. A copy of the testmix analysis will be initialed and placed in the instrument Quality Assurance/Quality Control (QA/QC) log.

When a new reagent does not give the desired results upon the analysis of a testmix and a blank, refer to the specific instrument's PMP to troubleshoot the system. After troubleshooting, if it appears the instrument is performing within acceptable parameters, re-analyze the testmix and the blank.

5.3 Labeling

5.3.1 Internally-Prepared Mobile Phases

Mobile phases prepared and used by explosive chemists will be recorded in a mobile phase or reagent preparation log. The log will contain the following information:

- Reagent name
- Preparation date
- Initials of preparer
- Name, manufacturer, and lot number of each component
- Expiration date, if applicable
- Initials of tester
- Whether the mobile phase worked as expected

Refills of mobile phase reservoirs containing deionized water only (e.g., ion chromatographs) do not need to be logged.

The following information will be placed on a stock container of a mobile phase prepared:

- Reagent name written in entirety
- Preparation date
- Initials of preparer
- Expiration date, if applicable

5.3.2 Solvents

The following information will be placed on solvent bottles upon opening the first time.

- Date opened
- Initials of opener (e.g., Op'd 6/01/16 *ABC*)

5.4 Expiration

The expiration date for reagents and solvents is determined by the expiration date provided by the manufacturer or determined by the individual PMP or SOP describing its preparation. Reagents and solvents may be used past their expiration dates provided that appropriate steps are taken with every use to demonstrate and re-verify their reliability. This may be accomplished by the analysis of standards, blanks, controls, and/or internal standards.

6 Safety

Safety protocols, contained within the FBI Laboratory Safety Manual, will be observed at all times.

Standard precautions will be taken for the handling of all chemicals, reagents, and solvents including standard universal precautions for the handling of biological and potentially hazardous materials. Refer to the FBI Laboratory Safety Manual for proper handling and disposal of all chemicals. Personal protective equipment will be used when handling any chemical and when performing any type of analysis.

Refer to the PMP for the specific instrument for additional safety information.

7 References

FBI Laboratory Quality Assurance Manual, Federal Bureau of Investigation, Laboratory Division, latest revision.

FBI Laboratory Operations Manual, Federal Bureau of Investigation, Laboratory Division, latest revision.

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division, latest revision.

Explosives Quality Assurance Manual, Federal Bureau of Investigation, Laboratory Division, Explosives, latest revision.

Explosives Standard Operating Procedures: Chemistry, Federal Bureau of Investigation, Laboratory Division, latest revisions.

Jungreis, E., *Spot Test Analysis*, 2nd Edition, John Wiley and Sons, Inc., New York, 1997.

Saferstein, R., *Forensic Science Handbook*, Vol. 2, Prentice Hall, Englewood Cliffs, New Jersey.

Rev. #	Issue Date	History
5	10/04/2018	Administrative changes for grammar and clarity. Added bullet in section 5.2 regarding solvent evaluation. Changed case notes to examination records in section 5.2.
6	07/15/2020	Removed fire debris from section 2 and removed SAU chief from approval lines.

Approval

Redacted - Signatures on File

Explosives Chemistry
Technical Leader Date: 07/14/2020

Explosives Unit Chief Date: 07/14/2020

QA Approval

Quality Manager Date: 07/14/2020